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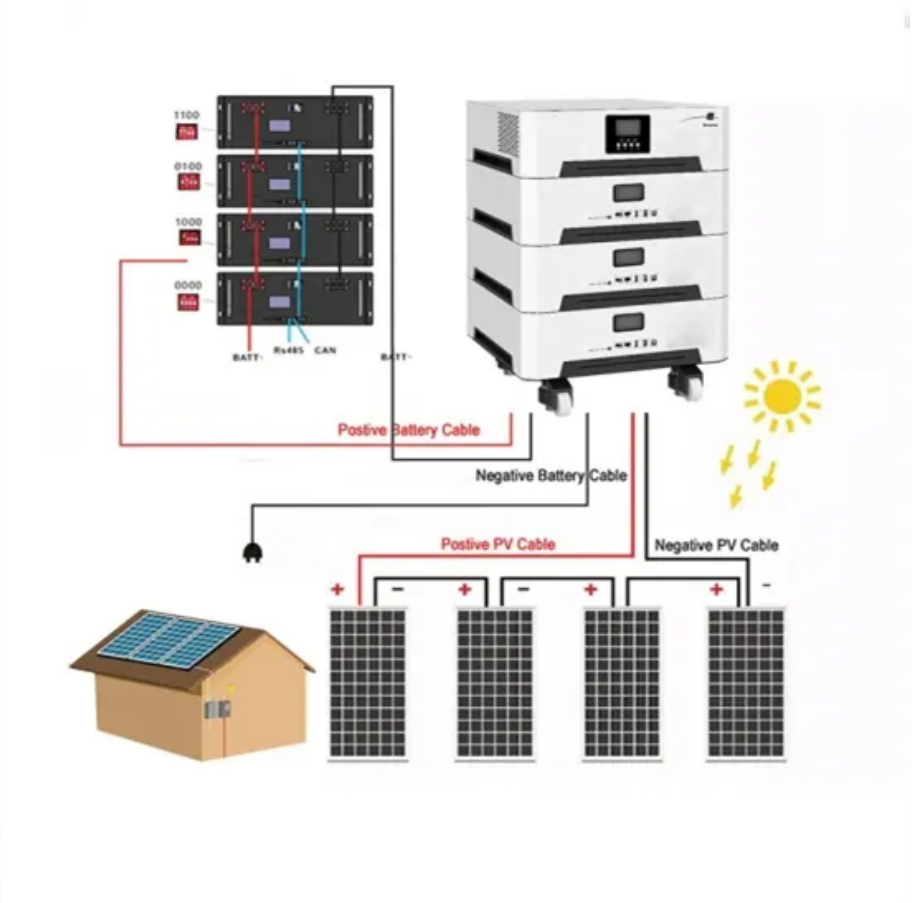
Flywheel energy storage motor heat dissipation



Overview

This simple and efficient design method provides a reference for the development of stator cooling systems for flywheel energy storage applications. Key words: flywheel energy storage, motor stator, design of heat dissipation, water jacket, temperature.

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To address the stator cooling challenges in the 500 kW flywheel energy storage motor, a spiral water jacket was installed on the outside of the stator. By simplifying the heat source and heat transfer model, an equivalent composite heat exchange model was established to optimize the liquid cooling.

This paper presents a comprehensive analytical framework for investigating loss mechanisms and thermal behavior in high-speed magnetic field-modulated motors for flywheel energy storage systems. Through systematic classification of electromagnetic, mechanical, and additional losses, we reveal that.

Abstract-This paper presents the loss analysis and thermal per-formance evaluation of a permanent magnet synchronous motor (PMSM) based high-speed flywheel energy storage system (FESS). The flywheel system is hermetically sealed and operates in a vac-uum environment to minimize windage loss created.

el energy storage application were analysed. Two heat pipes variations were used and attached to the outer surface of the electric motor, 4 energy storage through physical methods. Then, the key factors affecting the heat dissipation of the flywheel were obtained by combining thermal network.

This paper proposes a novel design of a magnetically supported flywheel energy storage system with thermal insulation. It utilizes a magnetic coupler

to directly transmit the power. The proposed design can induce almost no energy loss. If the power is transmitted indirectly by electromagnetic.

In this research, the effects of the heat pipes arrangement as a passive cooling system in an electric motor for the flywheel energy storage application were analysed. Two heat pipes variations were used and attached to the outer surface of the electric motor, 4 and 6 heat pipes arrangements.

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